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SUPERALLOY SN254037 SPECIFICATIONS

1. Overview

The alloy is reinforced nickel-based alloy, adding about 4% of the total aluminum and titanium generates gamma phase for aging strengthening, and add more solid solution strengthening of tungsten, molybdenum, also add trace boron to strengthen grain boundary. The alloy used under 850 ℃, has higher thermal strong resistance, good comprehensive performance and organizational stability, widely used in the manufacture of aircraft engine turbine blade, in 800-850 ℃ below use for a long time

1.1.Material Grade

SN254037

1.2.Similar grades

ХН70ВМТЮ-ВИ, ЭИ617-ВИ (Russia)

1.3.Technical Standard material

GB/T 14992-2005 - Classification and designation for superalloys and high temp. intermetallic materials
GB/T 14993-2008 - Hot-rolled superalloy bars for rotating parts

1.4.Chemical composition

C	Cr	Ni	W	Mo	Al	Ti	Fe	V	B	Ce	No more than				
											Mn	Si	P	S	Cu
0.03~0.10	13.0~16.0	Rest	5.0~7.0	2.0~4.0	1.7~2.3	1.8~2.3	≤5.0	0.1~0.5	≤0.02	≤0.02	0.50	0.40	0.015	0.10	0.07

1.5.Heat Treatment

State	Solution treatment	Aging
Hot-rolled bars	1. Solute - 1180℃, 2h, air-cooled 2. Solute - 1050℃, 4h, air-cooled or slow cooling	800 ℃, 16 h, air-cooled

1.6.Product Form

These alloys available in bars.

1.7.Applications

Widely used in the manufacture of aircraft engine turbine blade.

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2. Physical Properties

2.1.Thermal Performance

2.1.1. Melting Temperature – 1278~1346℃.

2.1.2. Thermal Conductivity

℃	100	200	300	400	500	600	700	800	900
λ [W/(m·℃)]	10.9	12.6	13.8	15.5	16.7	18.4	19.7	21.8	23.9

2.1.3. Coefficient of linear expansion

℃	20~100
α [10^{-6}·℃$^{-1}$]	11.9

2.2.Density – ρ = 8.37 g/cm^3

2.3.Magnetic – Non magnetic alloy

3. Mechanical Properties

3.1.Performance of technical standards

		Tensile Properties					Hardness [HBW]	high temperature persistent		
Standard	State	θ/℃	σ_b/ MPa	$\sigma_{0.2}$/ MPa	δ_5/%	φ/%		θ/℃	σ/MPa	Time [h]
GB/T 14993-2008	Hot-rolled bar	800	665		5	8	269~341	850	196	50
								800	245	100

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3.2.Durability and creep properties

3.2.1. Durability properties

Material	θ/°C	σ/MPa	Time [hours]
Cold drawn bar	700	100	471

3.2.2. High temperature creep properties

Material	θ/°C	σ/MPa	Time [hours]	δ_5/%
Cold drawn bar	700	294	100	0.2

3.2.3. Fatigue performance

Material	θ/°C	σ/MPa	N [no. of times]
Cold rolled plate	750	362	1.6x10E6-2.5x10E7

3.3.Elastic properties

3.3.1. Modulus of elasticity

Dynamic [E_D] modulus of elasticity at different temperatures.

°C	20	600	900
E_D [GPA]	225	186	157